



4. Press the word AUTO_G_P to run automatic, adaptive phase/gain matching between all PA modules in the system. A window pops up asking the user to confirm. Press Yes to start Optitune. It takes about 3 minutes to complete.



- 5. After Optitune is done, check all rejected power to see if they are within the desired range. If not, you can rerun Optitune again for optimization.
- 6. Raise the transmitter power level back to your desired level.

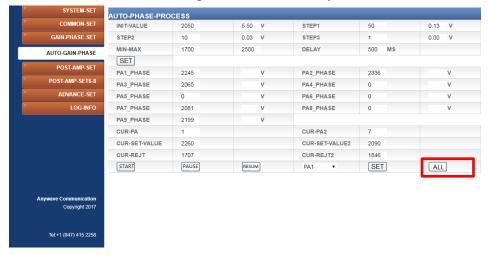
Remote Control:

The procedure of running Optitune via remote control is similar to the local control.

- 1. Make sure AGC is turned OFF, then lower the overall transmitter forward power level to 1kw.
- 2. Log in the Controller Web Interface.



- 3. Click to AUTO-GAIN-PHASE section on the left. Then on the right lower corner, click ALL to run.
- 4. After Optitune is done, check all rejected power to see if they are within the desired range. If not, you can rerun Optitune again for optimization.
- 5. Raise the transmitter power level back to your desired level.



Note: On the web interface it shows more readings/settings in the AUTO-GAIN-PHASE section. They are for manufacturer used. Please leave them untouched, or it may affect the Optitune performance.



4.7 VOLTAGE ADJUSTMENTS (Available in CTL-M)

When the transmitter is not running at its rated power, it may have headroom in power level. So that reducing the output DC voltage of PSUs will help improve the system efficiency. Optitune is only available in the model of CTL-M controller.

We provide a One-Button feature reducing all PSUs voltage to 46V for those users who need it. Also, a One-Button feature bringing PSUs voltage back to the regular 50V. <u>Local Control:</u>

1. Navigate to the System screen on the Controller by pressing the CONFIG button and then selecting AmpCF (Amplifier Configuration)



The AmpCF screen is used to configure advanced settings of the TX System and PAs and is locked with a password. When pressing the "AmpCf" button in the Config Menu, a pop-up window requiring a password will appear. Please enter the "AmpCf" password "27654" and then press "OK".





2. With the password properly entered, the AmpCf configuration screen will appear, as shown below. Press the System button.



- 3. The System screen is used to run Optitune (AUTO_G_P, see section 4.6) and One-Button Reducing/Resuming PSUs output voltage.
- 4. Press the V_Down button to One-Button reducing all PSUs' output DC voltage to 46VDC. If the transmitter is running at reducing power, reducing PSU output voltage will help improving system efficiency while performance still guaranteed.
- 5. Likewise, press the V_Resume button to One-Button bringing all PSUs' output DC voltage back to the regular 50VDC.





Remote Control:

- 1. Log in the Controller Web Interface.
- 2. Click to POST-AMP-SET section on the left.
- 3. Near the top, there are two buttons, one is "50V", which is the One-Button bringing all PSUs' output DC voltage back to the regular 50VDC. The other is "46V", which is the One-Button reducing all PSUs' output DC voltage to 46VDC.

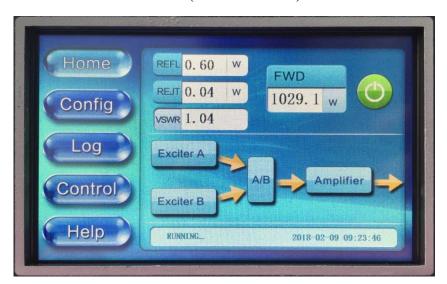




5. Local (Touch Screen) User Interface

5.1 HOME SCREEN

Turn on the power supply and the TX enters the initialization process, and after 5 seconds, the TX enters the home screen (as shown below).



The home screen is divided into 4 parts: Title Bar (left column), Power Metering (upper right), Block Diagram (middle right) and Status Bar (lower right), as shown below.

➤ **Title Bar**: Shown in the picture above, the "Home" button is highlighted, indicating the Home screen is now displayed. This TX Control Unit screen is a touch screen. You may navigate to the other screens (Config, Log, Control, Help) by simply touching the corresponding button in the Title Bar.

> Power Metering

- ON/OFF (Green) Button: Provides TX ON/OFF control. When GREEN (as shown above), this indicates the TX is ON. When RED, this indicates the TX is OFF.
 - Note: When there is an alarm, this button is always RED.
- FWD: Forward Power Meter. Touching the white display box of FWD will toggle its display units between "dBm" and "W".
- REFL: Reflected Power Meter. REJT" in the "Home" screen shows the value of rejected power. Press the white box beside the "REJT" button, to enter a screen showing all rejected power values. 1-PA TX has no reject load. 2-PA TX has 1 reject load. 3-PA system has 2 reject loads. 4-PA TX has 3 reject loads. 5-PA TX has 4 reject loads. If there is more than one "REJT" value, the



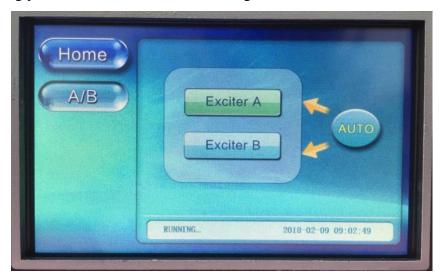
"REJT" value in the HOME screen will show the highest one (the one which is the closest to the preset threshold).

- VSWR: Voltage Standing Wave Ratio
- REJT: This is the system Reject Load Power Meter, derived from the REJT Load feedback sample. Displayed in units of "W" and cannot be changed.
- ➤ **Status Bar**: During normal operation, the default status is "RUNNING OK". If there is an alarm, the alarm will show up in the Status Bar of each screen.
- ➤ **Block Diagram**: Press the "Exc A/B" graphic to navigate to the Dual Exciters Switching screen (shown below). This screen shows which exciter is currently onair (highlighted GREEN) and allows the user to manually change the on-air exciter.



5.2 A/B EXCITER ICON SCREEN

Dual Exciters - Switching Screen: As mentioned above, pressing the "Exc A/B" icon will bring you to the Dual Exciters Switching Screen, a shown below.



Manual Exciter Switchover: Exciter A is the default on-air exciter. The on-air exciter's status will be "GREEN", as shown in the screen above, indicating that Exciter B is the current on-air exciter. Pressing the "Exciter A" or "Exciter B" button on this screen will cause a manual switch between exciters, that is if the Controller is "linked" to both exciters. (Note: In a dual exciter configuration, both exciters are on at the same time, producing an RF output signal the same time, and the Controller is considered "linked" with an exciter when the Controller detects an RF output present from the exciter as monitored inside the controller).

Auto Exciter Switchover: In a Dual Drive configuration, the TX is set to automatically switch to the standby exciter in the event a problem occurs with the on-air exciter. The TX will not automatically switch back to the original Exciter as long as the standby Exciter is operating properly. However, the TX will automatically switch back to the original Exciter in the event of a problem with the on-air (standby) exciter. So the TX will continue to automatically switch to the standby exciter in the event of a problem with the on-air exciter.

If neither of the exciters can be linked successfully (i.e. the Controller does not detect a valid RF output present from either exciter), a window will pop up, indicating "No Exciter Linked", as shown below.





➤ If the manual switching is successful, a window will pop up indicating "Change succeed!", as shown below.



➤ If the manual switching is not successful, a window will pop up indicating "Change failed!", as shown below.





Please note that the Exciter(s) communicates via an RS-485 bus to the Transmitter Control module. In a single drive TX, the Exciter will be configured with an RS-485 address ID of 80H (as found under the Exciter CONFIG submenu) corresponding with Exciter A. In a dual-drive TX, Exciter B will be configured with an RS-485 ID of 81H.

Pressing the Exciter A or Exciter B button will bring up a window displaying the Exciter Channel Frequency and well as the TX System SNR and Upper and Lower Shoulder metrics. Please note: only the on-air exciter has valid readings.





5.3 AMPLIFIER ICON SCREEN

Amplifier Status Screens: As mentioned above, pressing the "Amplifier" icon on the Home page, will navigate to the Amplifier Status Screens.



- ➤ Title Bar: includes "PreAmp", "Amp1", "Amp2", ("Amp3 and more buttons are for higher power transmitters in the MHPTV product line).
- PreAmp Status Screen



- IN: Input Power reading of the current preamp
- Cur1~Cur6: Currents of the current preamp



➤ Amp1 Status Screen









- Fwd: Forward Power reading of the current amplifier
- Refl: Reflected Power reading of the current amplifier
- IN: Input Power reading of the current amplifier
- VSWR: Voltage Standing Wave Ratio
- Temp: Temperature of the current amplifier
- V50: Reading of 50 V power supply of the current amplifier
- Fan1~Fan12: Fans' RPM of the current amplifier
- Cur1~Cur9: Currents of the current amplifier

Please note that the PAs communicate via an RS-485 bus to the Transmitter Control module. In a 2-PA TX, PA1 is configured with an RS-485 address ID of 130 and PA2 is set to 131 (in higher power TXs, PA3 is set to 132, PA4 to 133, PA5 to 134, PA6 is set to 135, PA7 to 136, PA8 to 137).



5.4 CONFIG SCREEN

Touching the Config button on the Title Bar of the Home Screen will navigate to the Config Screen, as shown below. The Config Screen has seven functional sections on the right. Press any of these buttons to navigate to that config screen. The Network screen is used to configure all the TX networking parameters including IP, Mask, and Gateway. The Time screen is used to set the current time. The AGC screen is used to turn the Controller AGC On/Off and to change the target AGC output power level. The AmpCf screen is for configuring the PA settings, including FWD and REFL fault threshold settings, and power meter calibrations. The Exciter screen provides Dual or Single Drive Exciter selection. The BootSet screen establishes how many times the TX attempts to reboot itself on power loss or fault conditions. The ClrALM screen allows the user to clear any previous alarms. Please Note: Modifying factory default configurations of certain parameters may lead to potential damage of the transmitter.

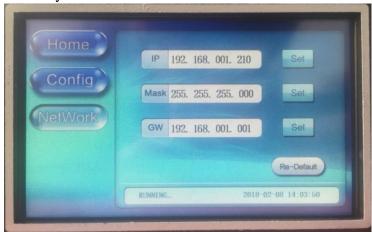




<u>Network Screen</u>: The User can check and set all the Controller network information in this screen.

■ Re-Defualt: Reset Default settings - This button is used to set all the network settings to the default values, as show below:

IP: 192.168.1.210 MASK: 255.255.255.0 GateWay: 192.168.1.1



■ Set: There is a Set button for each bar on this screen. Pressing the Set button will lead to the corresponding configuration screen of IP or Mask or GateWay accordingly. Using the IP setting as an example, Press any part of the white bar on the IP Setting Screen and the keyboard (shown below) will be enabled, turning from grey to yellow. The user can only set 3-digits of one bar at a time. When the configuration is finished, press OK to confirm. If the keyboard is enabled by mistake, press Cancel to exit the setting mode. Don't press Ok without entering a valid number, otherwise, the system will fill it with all zeros instead.





<u>Time Screen</u>: This screen is used to check and adjust the current time settings. It's similar to the Network Settings.



<u>AGC Screen</u>: This screen is used to set the AGC Reference output power of the TX and to turn the Controller AGC ON/OFF. Press the AGC button to turn AGC ON (button will turn green).





<u>AmpCf Screen</u>: This screen is used to configure advanced settings of the TX PAs. The AmpCf screen is locked with a password. When pressing the "AmpCf" button in the Config Menu, a pop-up window requiring a password will appear. The password for "AmpCf" access is "27654".



With the password properly entered, the AmpCf configuration screen will appear, as shown below.





<u>ComCf Screen</u>: This screen is used to configure the TX maximum operating thresholds to engage safety and protective power reduction and shutdown mechanisms.



- FwdMax: Max TX Forward Power fault threshold
- ReflMax: Max TX Reverse Power fault threshold
- Rejt1-7Max: Max TX Reject Load fault threshold
- VSWRMax: Max TX VSWR fault threshold

(Note: Press the word FwdMax, ReflMax, etc. to see a pop-up screen to modify these settings. Warning – changing these settings may cause improper TX operation, damage, and shutdown of the Transmitter System).



- FwdPara: Adjust to calibrate the main screen FWD Power Metering
- ReflPara: Adjust to calibrate the main screen Refl Power Metering



■ Rejt1-7Para: Adjust to calibrate the Rejt 1-7 Power Metering (Note: Press the word FwdMax, ReflMax, etc. to see a pop-up screen to modify these settings. Warning – changing these settings may cause improper TX operation, damage, and shutdown of the Transmitter System).

<u>PosID Screen</u>: This screen is used to configure and/or test the RS-485 communications between the Control module and each of the PA modules. With the TX Turned OFF and with a single PA connected (PA AC mains switched on and 485 serial connection established between the PA and Controller), PosID can be used to verify proper communications between each PA and the Control Module. With only PA#1 physically connected to the Control Module, pressing the Query button should return a value of 130. With only PA#2 physically connected, pressing the Query button should return a value of 131.





PosID Screen: Note: The PosID of each PA can be accessed and modified via the PA built-in LAN interface (192.168.1.200). Networking directly to the PA and pressing the System Set tab will bring up the following information. Here you can view and change the SYS_ID for the PA (Note: SYS_ID for PA1=130, PA2=131, PA3=132, PA4=133, PA5=134, PA6=135, PA7=136, PA8=137).



<u>AmpxCf Screens</u>: These screens are used to configure the Maximum PA operating thresholds to engage safety and protective power reduction and shutdown mechanisms.





Exciter Screen: This screen is used to configure the TX for single or dual exciters.



<u>Bootset Screen</u>: This screen is used to configure the number of attempts that the TX takes to successfully reboot on a shutdown condition, after which it gives up and remains off-air.





ClrALM: This is the Clear Alarm screen which is used to clear all alarms.

In LOCAL MODE, press the ClrALM button and a window pops out as below. Press Yes to clear all the alarms and restore the rated power. Alarms will not clear if they are currently active.



System:

The System screen is used to run Optitune (AUTO_G_P) and One-Button Adjusting PSU output voltage.

In LOCAL MODE, press the V_Down button to One-Button reducing all PSUs' output DC voltage to 46VDC. If the transmitter is running at reducing power, reducing PSU output voltage will help improving system efficiency while performance still guaranteed.

Likewise, press the V_Resume button to One-Button bringing all PSUs' output DC voltage back to the regular 50VDC.

Press AUTO_G_P to run automatic, adaptive phase/gain matching between all PA modules in the system. It takes about 3 minutes to complete.







5.5 LOG SCREEN

Pressing the Log button on Title Bar in the Home Screen will navigate to the Log Screen, as shown below. There are two pages of current alarm information as well as history alarms. Each page can show up to 5 alarm messages. The user can use the NextPage/PrePage button to switch between pages.

Please note: The Del-History button is used only to clear the status history of alarms. It will not clear any current active alarms which may require user intervention.





5.6 CONTROL SCREEN

Pressing the Control button on Title Bar in the Home Screen will navigate to the Control Screen, as shown below. The Control screen allows the user to switch between Local and Remote Control of the TX. In Local, the TX processes commands from the front panel touchscreen and ignores commands via the Controller web interface. In Remote mode, the TX processes command from the Controller Remote Web interface. Note: Be sure to switch the TX into Remote mode before leaving the TX site if Remote control of the TX is desired.





5.7 HELP SCREEN





6. Web Interface

6.1 TX WEB INTERFACE

The TX Control module provides a built-in web interface (192.168.1.210) that enables remote monitoring and control of the TX. This Control Module interface may be used for a variety of things, including turning the TX On/Off, manually switching between exciters (in a DD configuration), monitoring the voltages and currents of the PAs, calibrating the system and PA power meters, etc. Each Pa also has its own built-in web interface (PA web interface: 192.168.1.200).

A built-in web interface also exists in the Exciter that may be used for such things as adjusting the TX output power, performing corrections, etc. (please reference the separate Exciter User Manual for a detailed description of the Exciter web interface). The Control Module communicates with the Exciter(s) and PAs inside the TX via an RS-485 bus network.

The Control Module built-in web interface is accessible via the rear panel LAN RJ-45 connection, once networked to your PC, the Controller web interface may be accessed via a web browser (such as Internet Explorer or Firefox, etc.) by entering the IP address of the Controller (default 192.168.1.210, note: you can navigate to the Network setting under the Config menu to view and change the Controller IP address).

Launching a web browser and entering the Controller IP address (192.168.1.210) will bring up the following login window.



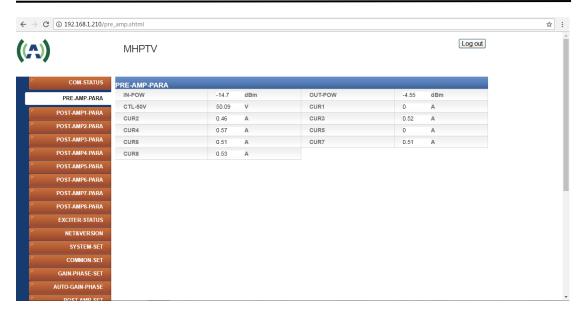


The "admin" tier provides full status and control of the Controller and is accessed with a username and password of "anywavecom" and "anywavecom" (case sensitive).

The screenshots below highlight the status and control available via the CTL-M Controller web interface for a 6-PA Doherty TX operating at 6.6KW.



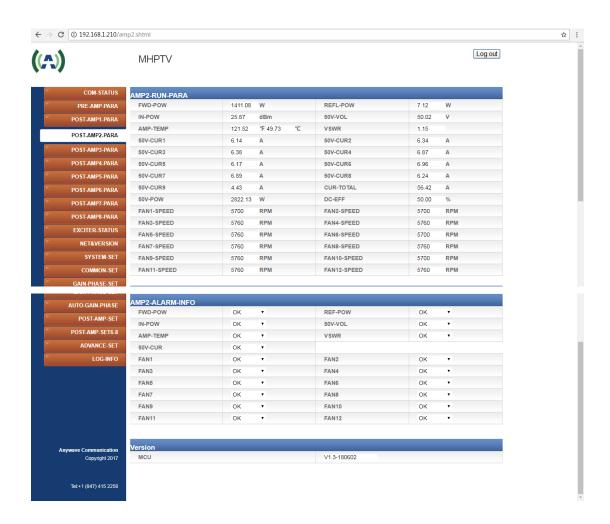




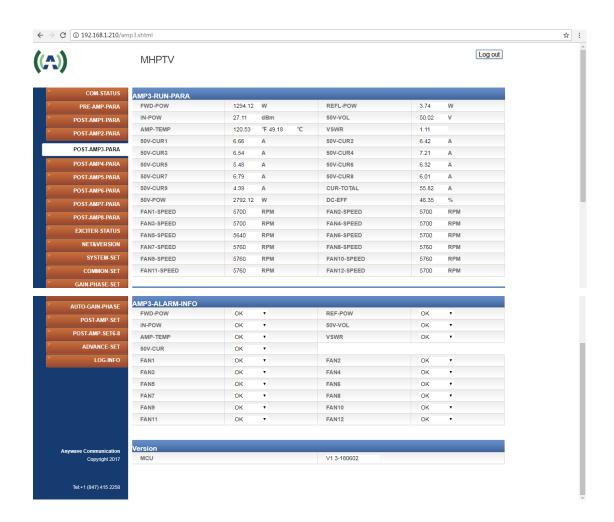
























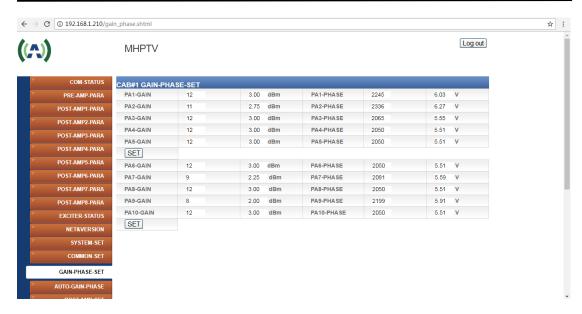




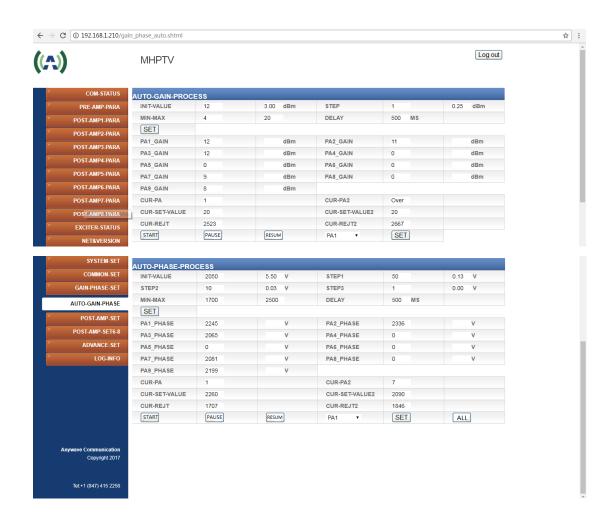










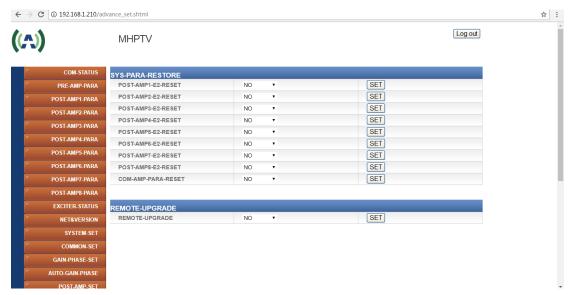




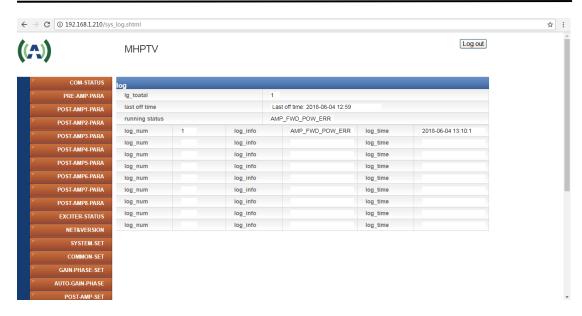














6.2 PA Web Interface

Each PA drawer installed in an MHPTV TX has its own built-in web interface accessible via the front panel LAN port (192.168.1.200).

The web interface allows the user to remotely monitor PA power levels, voltage, and device currents as well as view and modify PA network settings, max operating parameters, meter calibrations, RS-485 network ID, etc. (username and password of "anywavecom" and "anywavecom", both case sensitive).

The PA has four web pages as shown below.

